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SEVEN NEW AFRICAN SPECIES OF *SCAPHOIDOPHYES* KIRKALDY (HOMOPTERA: CICADELLIDAE)

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Abstract.—Seven new species of the genus *Scaphoidophyes* Kirkaldy, *S.* **attenuatus**, *S.* **furcatus**, *S.* **morbus**, *S.* **ramsayi**, *S.* **rigidus**, *S.* **spinatus**, and *S.* **wolfi**, are described from various countries of Africa. A key for the separation of species of this genus is included.

The genus *Scaphoidophyes* Kirkaldy previously included two species, *Scaphoidophyes annae* (Kirkaldy, 1906) and *Scaphoidophyes pyrus* (Barnett and Freytag, 1976). Seven new species from Africa are described here. Members of this genus are apparently widely distributed in Africa.

This genus was incorrectly spelled *Scaphoidophytes* in Barnett and Freytag (1976). The correct spelling is *Scaphoidophyes* which agrees with the original spelling by Kirkaldy (1906).

MATERIALS AND METHODS

The internal male genitalia were processed according to a technique developed by the author (Barnett, 1976). Illustrations of the male genital structures were made by the author using a projecting microscope. Styles were oriented for illustration with the two anterior ventral points of articulation and the posterior apex in a horizontal plane on a microscope slide. The valve and plate were flattened against a microscope slide with a coverslip. Further details of the techniques and definitions of the terms used can be found in Barnett (1977).

Color designations refer to the dictionary of standard color samples presented in the Methuen Handbook of Colour (Kornerup and Wanscher, 1967) and were made viewing the most recently collected specimen under illumination by an American Optical starlite 363V using a General Electric 1631X lamp.

I thank J. P. Kramer, Systematic Entomology Laboratory, USDA, at the U.S. National Museum of Natural History, Washington, D.C., and J. T. Medler, University of Wisconsin, Madison, for the specimens used in this study. All types are deposited in the U.S. National Museum of Natural History.

Genus *Scaphoidophyes* Kirkaldy

Scaphoideus (*Scaphoidophyes*) Kirkaldy, 1906: 154. Type-species: *Scaphoideus* (*Scaphoidophyes*) *annae* Kirkaldy, by monotypy.

Coloration.—Usually brown, golden brown to oxide yellow, forewing with coastal margin white to butter yellow, apical $^1/_5$ dark brown.

Structure.—Male usually smaller than female. Head same width or narrower than pronotum. Crown with bluntly angled anterior margin, face longer than wide. Forewing with moderately developed appendix, at least 2 reflexed crossveins between outer anteapical cell and coastal margin, anterior reflexed vein originating at middle of outer anteapical cell, 2nd reflexed vein more posterior, reflexed veins lying obliquely to costal margin, usually 2 anteapical cells, rarely the outer anteapical cell divided basad, 4 apical cells.

Genitalia.—Apex of male pygofer usually with large stout setae. Plate generally triangular with large stout setae. Style posterior cornutus usually pointed, lateral lobe present. Connective anteriorly-shaped, notched posteriorly. Paraphyses membranously attached posterolaterally. Aedeagus broad in ventral aspect. Female pygofer cone-shaped, short, with stout setae, usually with piece of 8th sternum visible laterally. Ovipositor usually extended beyond pygofer.

Key to the Species of *Scaphoidophyes*

(Males only)

1. Aedeagal base, in ventral aspect, separated from connective by two arms as long as connective length (Fig. 20) ..... *morbus*, new species
– Connective immediately joined to aedeagal base (Figs. 4 and 5) ... 2
2(1). Apex of aedeagal shaft in ventral aspect symmetrical, without lateral spines or processes (Fig. 11) 3
– Apex of aedeagal shaft in ventral aspect asymmetrical, processes or spines emanating laterally from only one side (Fig. 4) 5
3(2). Apex of aedeagal shaft in ventral aspect with two laterally directed recurved spines (Barnett and Freytag 1976: Fig. 10) ..... *pyrus* Barnett and Freytag
– Apex of aedeagal shaft in ventral aspect without two laterally directed recurved spines (Fig. 25) 4
4(3). Aedeagal shaft length in lateral aspect two times connective length (Fig. 36) ..... *spinatus*, new species
– Aedeagal shaft length in lateral aspect about equal to connective length (Fig. 10) ..... *furcatus*, new species
5(2). Pygofer in lateral aspect with posterior apex extended beyond

pygofer as a broad spatulate apically rounded piece equal to pygofer length (Fig. 39) ..... *wolfi*, new species

– Pygofer in lateral aspect without spatulate apex; may have spines or be roundly produced (Fig. 1) 6

6(5). Connective length in ventral aspect only slightly more than connective posterior width; aedeagus indirectly articulated to connective (Barnett and Freytag 1976: Fig. 6) ..... *annae* (Kirkaldy)

– Connective length in ventral aspect more than twice posterior width; aedeagus directly articulated with connective (Fig. 25) 7

7(6). Aedeagal shaft process emanating from shaft near basal third (Fig. 25) ..... *ramsayi*, new species

– Aedeagal shaft with process emanating near apex (Fig. 31) 8

8(7). Aedeagal base in lateral aspect with process emanating below aedeagal shaft (Fig. 29) ..... *rigidus*, new species

– Aedeagal base without basal process emanating below aedeagal shaft (Figs. 5 and 6) ..... *attenuatus*, new species

Scaphoidophyes attenuatus Barnett, New Species
Figs. 1–7

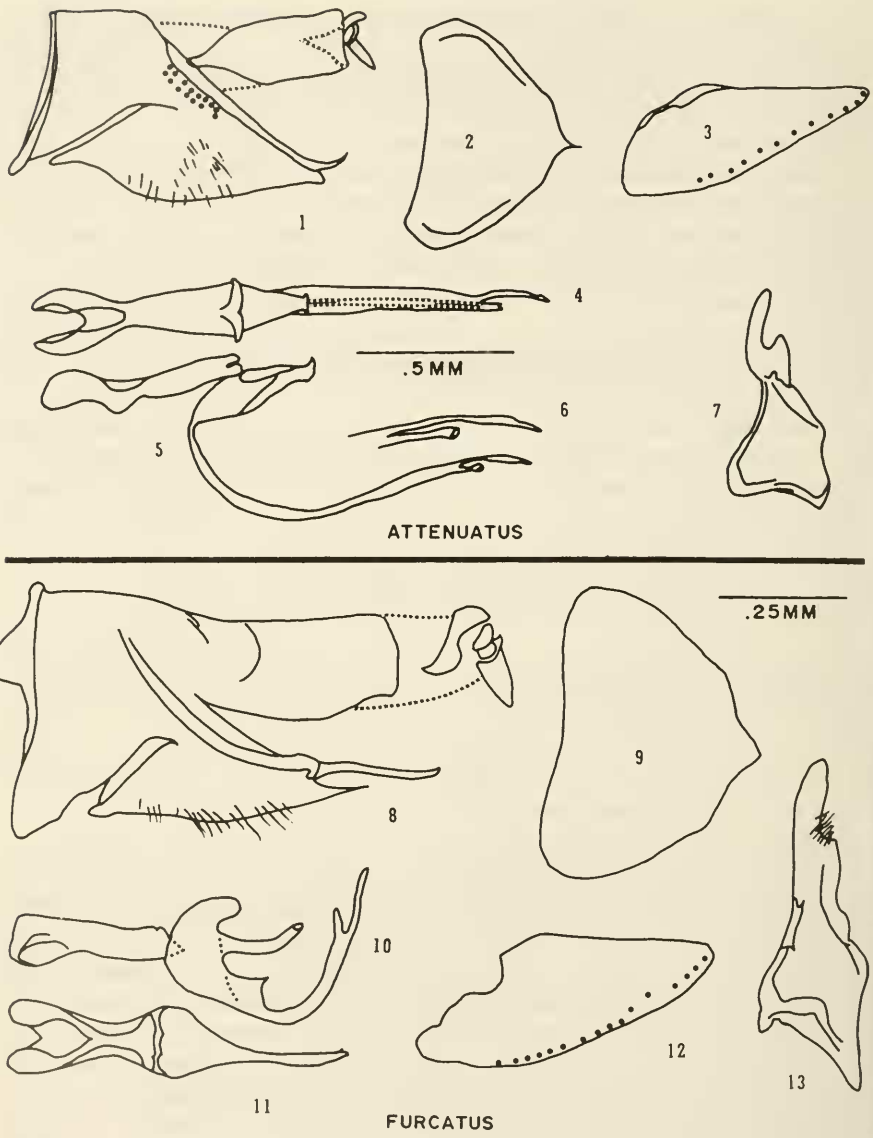
Diagnosis.—*Scaphoidophyes attenuatus* resembles *S. annae* by having the aedeagal shaft attenuated, but *S. attenuatus* has a right lateral spine on the aedeagal shaft and *S. annae* does not. In *S. attenuatus* the aedeagal base is not spade-shaped and dorsoventrally flattened as in *S. annae*, but *S. attenuatus* has the aedeagal base not much broader in dorsal view than the connective posterior apex.

Length.—Male, 5.6–5.9 mm; female, 5.9–6.2 mm.

Coloration.—Generally golden brown. Crown raw umber anteriorly faded to golden brown near posterior margin, with apical white dot, white dot on each side of apex, narrow white medial line, posterior white line and white lateral areas on posterior margin not reaching eyes; eyes copper red to English red with white longitudinal line; face pale yellow. Pronotal anterior area brown, faded to brownish yellow at posterior margin. Scutellum pale yellow with central area melon, and triangular anterolateral marginal areas light brown. Legs cream to pale yellow. Forewing translucent, brownish yellow, veins golden brown, anterior margin yellowish white, dark brown medial spot, apical $^1/_5$ dark brown. Female abdomen ventrally pale yellow, dorsally raw umber. Pygofer maize, faded to yellowish brown near posterior margin. Ovipositor brownish orange.

Structure.—Coronal length equal to interocular width, anterior ½ minutely punctured; head anterior angle 95°.

Male genitalia.—Pygofer elongated, posterior dorsal margin thickened (may be anal collar) into heavy spine; unsclerotized angle below spine;



Figs. 1–13. Male genitalia. 1–7, *Scaphoidophyes attenuatus*. 1, Pygofer, lateral aspect. 2, Valve, ventral aspect. 3, Plate, ventral aspect. 4, Connective and aedeagus, ventral aspect. 5, Connective and aedeagus, lateral aspect. 6, Tip of aedeagus enlarged, lateral aspect. 7, Style, ventral aspect. All structures drawn to same scale. 8–13, *S. furcatus*. 8, Pygofer, lateral aspect. 9, Valve, ventral aspect. 10, Connective and aedeagus, lateral aspect. 11, Connective and aedeagus, ventral aspect. 12, Plate, ventral aspect. 13, Style, ventral aspect. All structures drawn to same scale.

dorsal margin with numerous large setae near middle and numerous small setae near ventral margin and interior. Valve triangular with posterior, medially produced point. Plate long, pointed; row of large setae near lateral margin. Style length twice anterior width. Connective anterior bifid. Aedeagal base small; aedeagal shaft long; spine on left lateral margin of aedeagal shaft near posterior apex and extended beyond apex; gonopore anteapical.

Types.—Holotype ♂ labeled "Suakoke [!, Suakoko], Liberia 1-28-52 13/ C.C. Blickenstaff/light trap." Allotype (same data as holotype) and 4 ♂ and 7 ♀ paratypes (same data as holotype, but two specimens dated 12/8/51 and one dated 2/16/53).

Scaphoidophyes furcatus Barnett, New Species
Figs. 8–13

Diagnosis.—*Scaphoidophyes furcatus* resembles *S. annae,* but the aedeagal base of *S. furcatus* is not spade-shaped.

Length.—Male, 5.3 mm.

Coloration.—Generally golden brown. Crown raw umber with apical white spot, two lateral central spots, medial white line, and two pale yellow dashes on posterior margin on each side of medial line; eyes dark brown with longitudinal white line; face pale yellow. Pronotum golden yellow with anterior yellowish brown band, medial white line across band, and 2 lateral spots on each side of medial white line. Scutellum white, with light brown anterolateral, triangular areas. Forewings brownish yellow, veins golden brown, anterior forewing margin pale yellow with yellowish brown parallelogram, apical $^1/_5$ yellowish brown.

Structure.—Coronal length equal to interocular width.

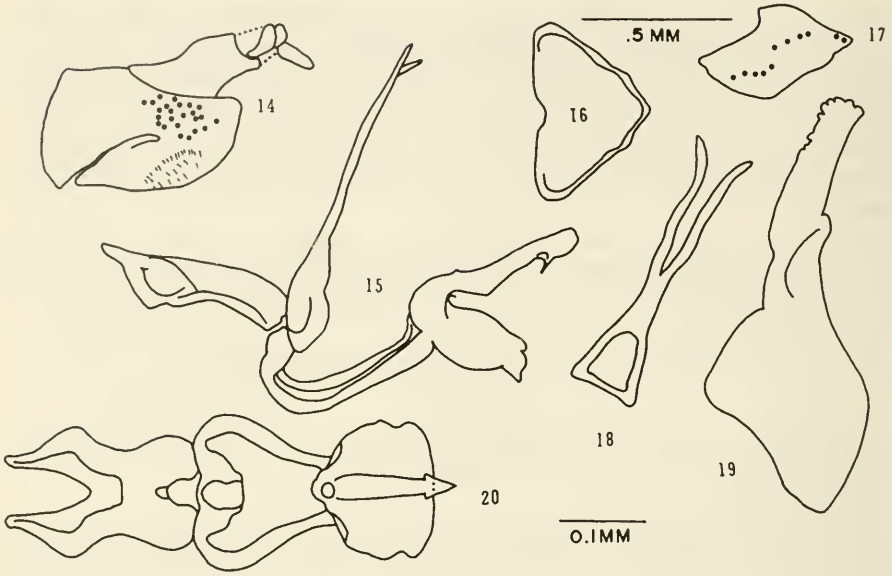
Male genitalia.—Pygofer length 2× anterior height; anal collar extended posteroventrally to apical spine which extends ⅓ of pygofer length beyond pygofer posterior margin; anal tube large; anterior apodeme present. Valve triangular, posterior margin uneven. Plate with medial margin straight, lateral margin convex, and with large setae laterally. Style length 3× anterior width; setae at juncture of lateral lobe and cornutus. Connective bifid anteriorly, dorsal apodeme present, posterior margin articulated with aedeagal base. Aedeagal base in lateral aspect with ventral process canted ventrad then dorsad; apex of process bifid, aedeagal shaft medial, gonopore apical.

Type.—Holotype ♂ labeled "Suakoke [!, Suakoko] Lib./Blickenstaff/ 1-28-'52—4089."

Remarks.—This species is known only from the holotype.

Scaphoidophyes morbus Barnett, New Species
Figs. 14–20

Diagnosis.—*Scaphoidophyes morbus* resembles *S. attenuatus* but has the aedeagus separated from the connective by two arms.



Figs. 14–24. Male genitalia. 14–20, *Scaphoidophyes morbus*. 14, Pygofer, lateral aspect. 15, Connective, dorsal piece of aedeagus, aedeagus, lateral aspect. 16, Valve, ventral aspect. 17, Plate, ventral aspect. 18, Dorsal piece of aedeagus, caudal aspect. 19, Style, ventral aspect. 20, Connective and aedeagus, ventral aspect. All external structures drawn to same scale; all internal structures drawn to same scale. 21–24, *S. ramsayi*. 21, Pygofer, lateral aspect. 22, Valve, ventral aspect. 23, Connective and aedeagus, lateral aspect. 24, Plate, ventral aspect. All external structures drawn to same scale; all internal structures drawn to same scale.

Length.—Male, 4.8 mm.

Coloration.—Generally yellowish brown to raw umber. Crown yellowish brown with lighter anterior brown band, apical medial longitudinal white dash, and pale yellow spot on each side of longitudinal dash and eye; face pale yellow; eye copper red with longitudinal white line. Pronotum brown to dark brown, darker near anterior margin. Scutellum central area white with yellow-orange tinge to central part of white area, anterior lateral margins raw umber. Forewings yellowish brown, veins darker, anterior margin translucent pale white, posterior $^1/_5$ raw umber. Legs same as *S. attenuatus*.

Structure.—Interocular width equal to coronal length; crown depressed before apical margin, minutely punctured.

Male genitalia.—Pygofer length 2× anterior height, large setae mostly dorsal. Valve triangular, posterior margins sinuous, anterior margin emarginate. Plate parallelogram-shaped, margins irregular, large setae centrally located, 2 setae near posterior apex. Style anterior part robust; lateral lobe very small; apical cornutus rectangular, apex and inner margin with crenulations. Connective bifid anteriorly and posteriorly; dorsal apodeme present; length 1½× width. Aedeagus articulated to connective, with dorsal and ventral parts; dorsal piece almost as long as ventral piece, bifid apically for over ½ length; ventral part with 2 arms extended laterally and then medially, heart-shaped in ventral aspect, arms attached posteriorly to large ovoid piece from which extends aedeagal shaft; shaft apically pointed in ventral aspect, gonopore apical.

Type.—Holotype ♂ labeled "S. Africa: Transvaal/5 km. w. Raapmuiden/ 26 January 1974/Ashley. B. Gurney."

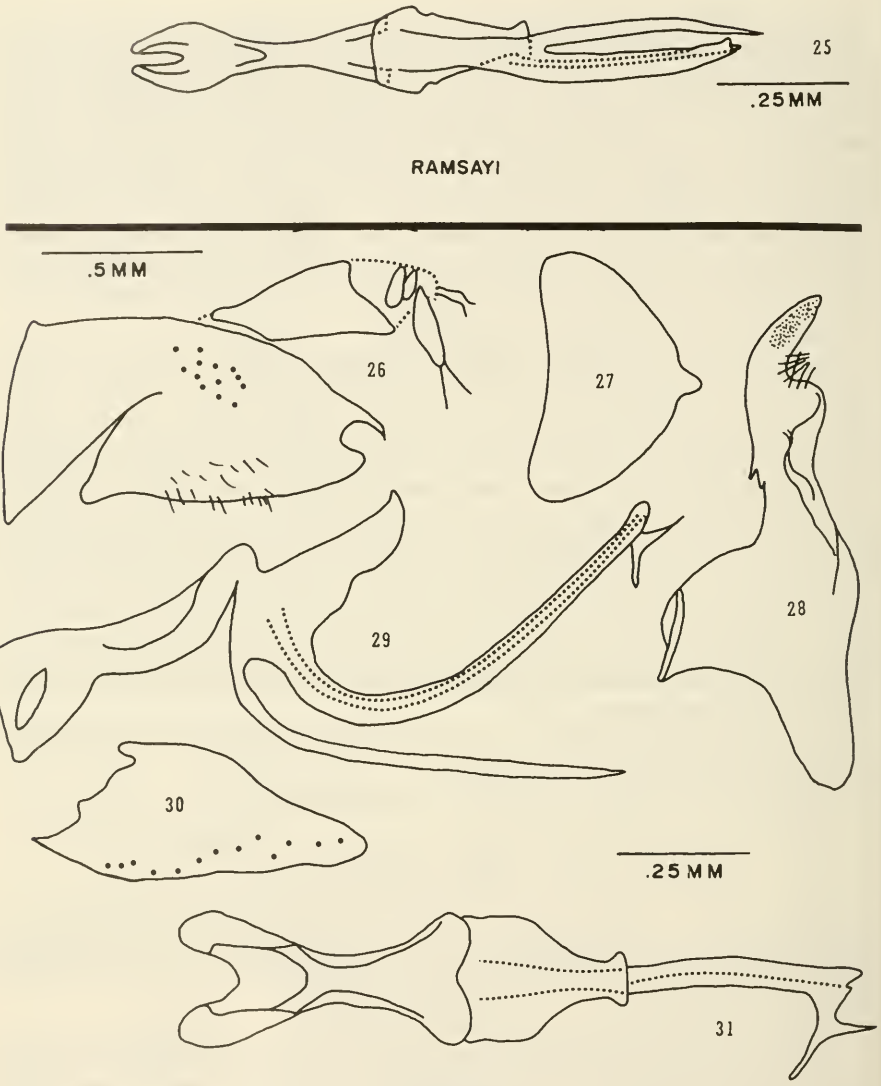
Remarks.—This species is known only from the holotype.

Scaphoidophyes ramsayi Barnett, New Species
Figs. 21–25

Diagnosis.—*Scaphoidophyes ramsayi* resembles *S. attenuatus*, but the lateral process of the aedeagal shaft is longer, broader, and more sinuous than in *S. attenuatus*.

Length.—Male, 5.2–5.5 mm; female, 5.0 mm.

Coloration.—Generally brownish yellow. Crown raw umber faded to yellowish brown posteriorly with apical pale yellow dot, lateral pale yellow area on each side of pale yellow medial line, and posterior margin with white dots on each side of medial pale yellow area; eyes copper with longitudinal white line; face pale yellow. Pronotum yellow, anterior irregular band raw umber. Scutellum pale yellow, central area yellow, triangular anterior areas brownish orange. Forewing brownish yellow, anterior veins yellowish brown, posterior veins same as ground color, anterior margin translucent white to pale yellow, anterior central blotch raw umber, apical $^1/_5$ raw um-



Figs. 25–31. Male genitalia. 25, *Scaphoidophyes ramsayi*, connective and aedeagus, ventral aspect. Scale as indicated. 26–31, *S. rigidus*. 26, Pygofer, lateral aspect. 27, Valve, ventral aspect. 28, Style, ventral aspect. 29, Connective and aedeagus, lateral aspect. 30, Plate, ventral aspect. 31, Connective and aedeagus, ventral aspect. All external structures drawn to same scale; all internal structures drawn to same scale.

ber. Legs same as in *S. attenuatus*. Female abdomen pale yellow ventrally, anterior area raw umber. Pygofer pale yellow. Ovipositor light brown.

Structure.—Coronal length equal to interocular width.

Male genitalia.—Pygofer with anal tube about 3× as long as anterior height; anal collar somewhat reduced but extended posteriad to apical spine; spine with several ventral spines; anal tube robust. Valve triangular, margins slightly irregular. Plate length 3× anterior width with large lateral setae. Style length 2× anterior width; lateral lobe with setae. Connective bifid anteriorly and posteriorly, articulated with aedeagus. Aedeagus bilaterally asymmetrical in ventral aspect, spine on right side longer than aedeagal shaft on left side; gonopore apical.

Types.—Holotype ♂ labeled "Nigeria: Ile-Ife/W State 7 Jun 1973/J. T. Medler Coll." Two ♂ paratypes with same data as holotype but one dated "29 Dec 1972."

Remarks.—This species is named for Maynard Ramsay, USDA, APHIS, Plant Protection and Quarantine, who is well known for his ardent endeavors to prevent the entry and establishment of foreign species detrimental to American agriculture.

Scaphoidophyes rigidus Barnett, New Species
Figs. 26–31

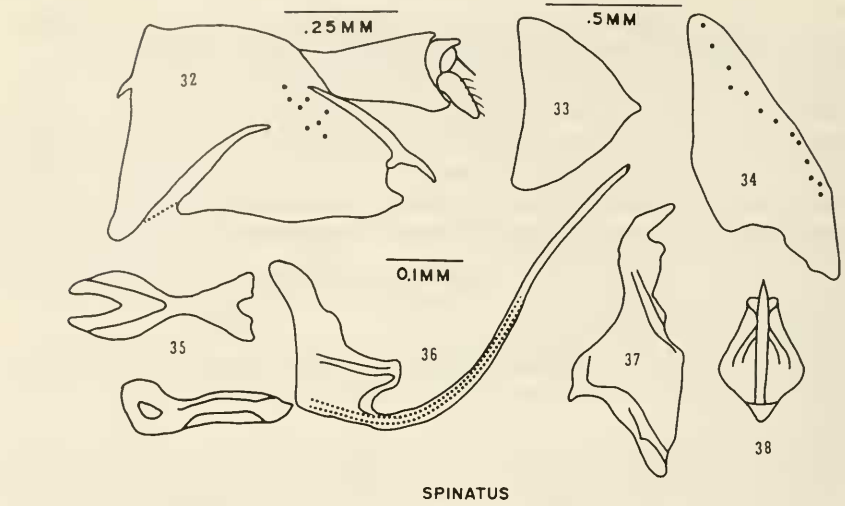
Diagnosis.—*Scaphoidophyes rigidus* resembles *S. attenuatus*, but *S. rigidus* has a long spine below the aedeagal shaft.

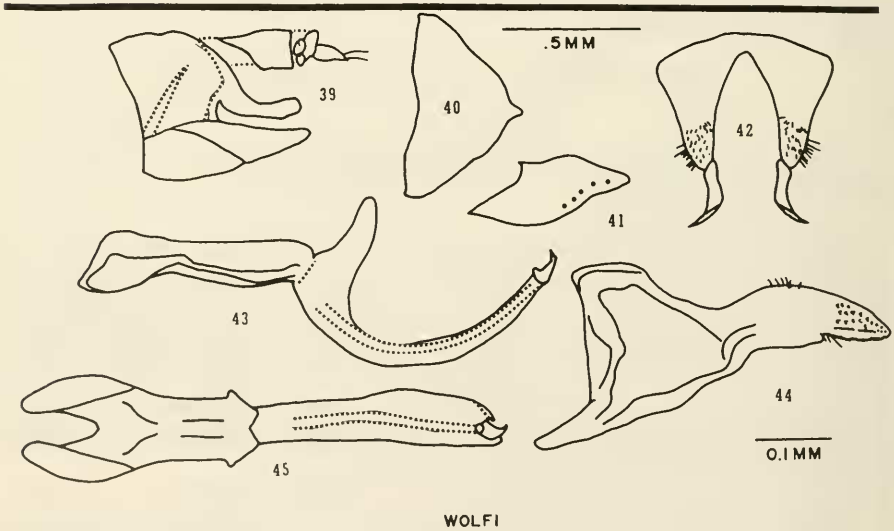
Length.—Male, 4.9 mm.

Coloration.—Generally oxide yellow. Crown generally raw umber with white anterior apical dot, white irregular transverse blotch, and butter yellow posterior margin; face pastel yellow; eyes brown with longitudinal grey line. Pronotum orange with anterior golden brown band, 2 lateral white to yellow spots, and faint medial longitudinal butter yellow line. Scutellum white, central area melon, anterior lateral triangles brownish yellow. Legs pastel yellow. Forewing translucent apricot yellow, posterior veins yellowish brown, apical area raw umber.

Structure.—Coronal width 1¼ coronal length; head anterior angle 95°.

Male genitalia.—Pygofer 2× as long as anterior height with posterior apical spine. Valve triangular, posterior margin medially protuberant. Plate with inner margin sinuous, lateral margin straight with large setae. Style with lateral piece of anterior part prominent; setae at juncture of lateral lobe and apical cornutus; cornutus punctate. Connective bifid anteriorly, fused to aedeagus posteriorly. Aedeagus bilaterally asymmetrical in lateral aspect, with aedeagal shaft emanating from ventral portion of aedeagal base; shaft curved dorsad; ventral spine nearly as long as aedeagus and also emanating from aedeagal base, in ventral aspect shaft with left apical projection with 2 spines; gonopore apical.





Figs. 32–45. Male genitalia. 32–38, *Scaphoidophyes spinatus*. 32, Pygofer, lateral aspect. 33, Valve, ventral aspect. 34, Plate, ventral aspect. 35, Connective, ventral aspect. 36, Connective and aedeagus, lateral aspect. 37, Style, ventral aspect. 38, Aedeagus, caudal aspect. Pygofer, plate, style, aedeagus in caudal aspect, and connective in ventral aspect drawn to 0.25 mm scale, valve drawn to 0.5 mm scale. Connective in lateral aspect drawn slightly smaller than 0.25 mm scale. Aedeagus drawn to 0.1 mm scale. 39–45, *S. wolfi*. 39, Pygofer, lateral aspect. 40, Valve, ventral aspect. 41, Plate, ventral aspect. 42, Pygofer, dorsal aspect. 43, Connective and aedeagus, lateral aspect. 44, Style, ventral aspect. 45, Connective and aedeagus, ventral aspect. All external structures drawn to same scale; all internal structures drawn to same scale.

Type.—Holotype ♂ labeled "Genewonday/Cape Mount/Liberia/2-17-53-15/C. Blickenstaff/swept."

Remarks.—This species is known only from the holotype.

Scaphoidophyes spinatus Barnett, New Species
Figs. 32–38

Diagnosis.—*Scaphoidophyes spinatus* resembles *S. attenuatus*, but the aedeagus of *S. spinatus* is symmetrical.

Length.—Male, 5.7 mm.

Coloration.—Generally oxide yellow. Crown yellow brown with apical pale yellow area, pale yellow lateral blotches on each side of thin pale yellow medial longitudinal line, and posterior ¼ maize; face cream; eyes mandarin orange with longitudinal white line. Pronotum golden yellow with anterior brownish yellow band, posterior margin of band ragged. Scutellum light yellow with oxide yellow to orange triangular areas. Forewings translucent golden yellow, veins brownish yellow, anterior margin transparent with pale yellow tint, apical margin yellowish brown. Legs cream to pale yellow.

Structure.—Coronal length equal to interocular width.

Male genitalia.—Pygofer length 1½× anterior height; anal collar extended from base of anal tube to beyond posterior apex as a spine. Valve triangular, inner and lateral margins rather straight, apex bluntly pointed. Plate triangular with large lateral setae. Style anterior part robust, lateral lobe angular, apical cornutus canted laterad. Connective bifid anteriorly and posteriorly; dorsal and ventral apodemes present; connective articulated to aedeagus posteriorly. Aedeagal base in caudal aspect teardrop shaped, in lateral aspect with ventral process extended from ventral area of base, ventral process extended 2× basal height beyond base posteriorly; gonopore apical.

Type.—Holotype ♂ labeled "Suakoke [! Suakoko]/1-28-52/C C Blickenstaff/Light trap."

Remarks.—This species is known only from the holotype.

Scaphoidophyes wolfi Barnett, New Species
Figs. 39–44

Diagnosis.—*Scaphoidophyes wolfi* resembles *S. rigidus* in aedeagal form, but *S. wolfi* does not have a large asymmetrical piece emanating from the apex of the aedeagal shaft.

Length.—Male, 4.9 mm.

Coloration.—Generally yellowish brown. Coronal vertex raw umber with 2 lighter spots on each side of a light medial line and 3 white spots on anterior margin of vertex; eyes yellowish brown; face yellowish white. Pronotum with raw umber anterior band interrupted with 5 longitudinal pale yellow lines; remainder of pronotum brownish yellow. Scutellum white to yellowish white, central area pale yellow, anterior lateral areas dark brown.

Forewing generally brown with some lighter areas in cells, costal margin pale yellow to cream. Legs pale yellow. Female abdomen ventrally pale yellow, dorsally dark brown. Pygofer anterior areas maize, posterior brown; ovipositor brown with lateral cream stripe on each side.

Structure.—Coronal length equal to interocular width.

Male genitalia.—Pygofer short, in lateral and ventral aspect with apices prominent, apical pieces extended beyond pygofer the length of the pygofer. Valve generally triangular. Plate with lateral and inner margins sinuous, with large lateral setae. Style length slightly more than anterior width; lateral anterior articulation extended anteriorly; cornutus pitted; small setae at juncture of lateral lobe and cornutus and on inner margin opposite lateral lobe. Connective bifid anteriorly, articulated to aedeagus posteriorly, short, about 2× as long as wide in ventral aspect; dorsal apodeme present. Aedeagus bilaterally asymmetrical, in ventral aspect with left side of aedeagal shaft bulged apically, in lateral aspect C-shaped; apical spine present; gonopore apical.

Types.—Holotype ♂ labeled "Nigeria: Zugurma/NW State 15 Sep 1974/ J. T. Medler Coll." One ♂ and 1 ♀ paratypes (same data as holotype).

Remarks.—This species is named for Duane C. Wolf, Department of Agronomy, University of Maryland, who gave support which made possible this study. This species is known only from the holotype.

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